

support of the gate-insulating film being silicone oxide or silicone nitride. However, Chen does not teach, nor can it reasonably be considered to have suggested such features.

Claim 13 of Chen recites that the "insulating layer" is silicone nitride or silicone oxide. The Office Action appears to be asserting that this means the gate-insulating layer 34 may be composed of silicone oxide. However, the insulating layer referred to in claim 13 is not the gate-insulating layer. Claim 8 of Chen separately recites a gate-insulating layer formed on a polysilicone layer, and an insulating layer and a barrier layer sequentially formed on the entire surface of the substrate. These layers are all depicted in Fig. 2C of Chen. The insulating layer 40 is the layer that is being referred to in claim 13, and does not correspond to the Office Action's allegedly corresponding gate-insulating layer 34. This fact is further highlighted by the feature in claim 1 of Chen of removing the insulating layer, which is not covered by the remaining part of the barrier layer, wherein the remaining part of the insulating layer is positioned on the sidewall of the gate. This is depicted in Fig. 2E of Chen where the remnants of the barrier layer 42 and insulating layer 40 can be seen stacked on one another as bumper 44 and spacer 46, respectively. The layer 34 is not apparently removed.

The Office Action also relies on Kato for remedying shortfalls in Chen regarding the compositions of the various layers. For example, the Office Action, on page 4, asserts that it would have been obvious to use silicon nitride, which is used as the protective film 115 in Kato, for the insulating layer 40 of Chen, thereby using a material that differs from the gate-insulating film (alleged to be silicon oxide), because Kato teaches that nitride beneficially excludes the influence of alkali metals and moisture. However, the Office Action's rationale is internally inconsistent and is not a proper combination based on the different configurations and purposes of the insulating layer 40 of Chen and protective film 115 of Kato.

First, this assertion contradicts the alleged corresponding configuration relied upon in the same rejection at the top of page 3. Specifically, the Office Action asserts on page 3 that

Chen discloses a second insulating film of silicon nitride having a different composition than a first insulating film of silicon oxide, whereas the Office Action also asserts that, in order for the gate-insulating layer and the first insulating film to be different compositions, the first insulating film would be silicon nitride. Thus, the Office Action fails to present a coherent *prima facie* case for obviousness of these features.

Second, although Kato teaches that nitride beneficially excludes the influence of alkali metals and moisture, this would not have motivated one of ordinary skill in the art to modify the configuration of the Chen device. The protective film 115 in Kato covers the gate electrode 111(a) and gate insulating film 110. The insulating layer 40 of Chen is etched away leaving only insulating spacer 46 that, as depicted in Fig. 2E, does not cover either the gate electrode or the insulating layer 34. As such, the alleged benefit of excluding the influence of alkali metals and moisture is not germane to the insulating layer 40 of Chen. Moreover, the configuration of the Kato device would not have logically commended itself to one of ordinary skill in the art looking to modify Chen based on the significantly different objectives of the respective subject matter of these references.

Additionally, the Office Action's assertions regarding the alleged obviousness of the features of the second insulating layer having a thickness of more than twice the thickness of the gate electrode and tapering the gate electrode between 20° and 80° are improper.

In the December 27, 2006 Amendment, independent claims 1, 4, 5 and 10 were amended to include the feature of the second insulating layer having a thickness of more than twice the thickness of the gate electrode. The Office Action concedes that the applied references do not disclose such a feature. However, the Office Action asserts that these features are *prima facie* obvious without a showing that the claimed ranges achieve unexpected results relative to the prior art range. The Office Action goes on to assert that there exists no evidence of record that the relative thicknesses provide unexpected results in

the semi-conductor device produced. These assertions are incorrect for at least the following reasons.

On page 9 of the December 27 Amendment, Applicant stated that such relative thickness of the second insulating layer provides for a relatively long lightly doped drain (LDD), as described, for example, in paragraph [0078] of the specification. Clearly this is an advantage that the Office Action cannot properly ignore. In order to assert that such purported optimization would have been obvious, the Office Action is required to first establish by specific objective evidence in the prior art that the claimed feature is a result-effective variable. In other words, the Office Action must provide support for why one of ordinary skill in the art would have been motivated to optimize the specific variable in question. Applicant maintains that no such objective evidence of record has been demonstrated that can reasonably be considered to have suggested that a relative thickness of a second insulating layer with respect to the gate electrode was a recognized result-effective variable for controlling LDD length with regard to configurations of the specific devices disclosed in the applied references. And, even if such a showing were made, the Examiner must still address Applicant's evidence of record that the relative thickness does provide unexpected results in the semiconductor device produced.

This analysis applies to the Office Action's failure to consider evidence previously presented regarding the feature of tapering the gate electrode between 20° and 80° as well. Applicant identified specific portions of the specification that disclose unanticipated benefits produced by these angles in Applicant's August 25, 2006 Amendment (e.g. paragraphs [0019] and [0082], and Fig. 11 of Applicant's disclosure, as filed), yet the Office Action asserts this also is only optimization, again without first establishing that the taper angle was recognized as a result-effective variable with a showing of some specific objective evidence in the prior art. Such a repeated approach in discounting positively recited features of the pending claims

in an effort to render obvious the claims as *prima facie* obvious without evidentiary support is improper.

Further, it is improper for the Examiner to first assert that optimizing the taper angle to provide for device performance would be obvious and then further assert that optimizing the thickness of the second insulating layer relative to the gate electrode would be obvious to provide for processing limitations and device performance, when the applied references do not teach any corresponding method that would take into account both of these factors to achieve any disclosed device performance. Therefore, the assertion that optimizing these two distinct variables to achieve an unspecified notional "optimal performance" is without basis.

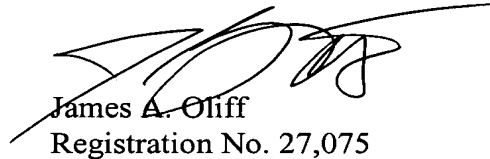
For at least the above reasons, the applied references do not teach, nor can they reasonably be considered to have suggested, the combinations of features positively recited in claims 1, 4, 5 and 10. Additionally, claims 2, 3, 6, 8, 9, 11 and 12 are also neither taught, nor would they have been suggested, by the applied references for at least the respective dependence of these claims, directly or indirectly, on an allowable base claim as well as for the separately patentable subject matter that each of these claims recites.

Accordingly, reconsideration and withdrawal of the rejections of claims 1-6 and 8-12 are respectfully requested.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-6 and 8-12 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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